REMARKS

Reconsideration of this patent application is respectfully requested in view of the foregoing amendments and the following remarks.

The Examiner has requested a legible copy of the amendment filed on August 28, 2002. Enclosed is a copy of that amendment. In addition the text of that amendment, in particular the portion of the specification that was added in that amendment has been restated above to be added in the present amendment based upon the Examiner's request.

The Examiner has rejected claims 4-9 under 35 U.S.C. 112 first and second paragraph. In particular, the examiner has rejected claim 7 and has objected to the paragraph on page 9.

The specification has been amended to overcome this rejection. In particular, previously added elements that were rejected have been removed and the paragraph starting on page 9 line 8 has been amended for greater clarification. No new matter has been added. The applicant believes that claim 7 as written should be allowable over this rejection in view of this amendment. In addition, claim 7 has been amended to further clarify this claim. Furthermore, with reference to the term

"sharply focusing" this term is a general term of the art and is known in the radar field such as from the reference to *Klausing* particularly in claim 1 of *Klausing*. However, *Kluasing* does not disclose "a sharply focusing antenna that is sharply focused in elevation and covers the lower range of the sight angle" wherein this passage was contained on page 10 of the originally filed specification. The specification has been further changed to meet the Examiner's request so that the term "sharply focusing" has been replaced with the term "narrow beam" which is a relative term that is inherent in a "sharply focused" beam.

The Examiner has rejected claims 4-9 under 35 U.S.C. 102 (b) in view of U.S. Patent No. 5,451,957 to *Klausing*.

The applicant respectfully traverses this rejection.

In particular, claim 4 discloses the following element:

an additional transmitting/receiving antenna ~~sharply~~ that has a narrow beam and focused downward in elevation covering a lower range of a sight angle.

This element is particularly important because it is used to develop a 3D or three dimensional image in azimuth and elevation

at the same time by simultaneous use of the rotating antenna and the triangulation principle. In addition, this design also allows for additional information about the absolute height and elevation. This antenna determines the distance of the helicopter to the ground imaged at the lower end of the image. Thus, with this design, it is possible to generate 3-D dimensional images with absolute azimuth and elevation and distance information. Thus, the applicant believes that claim 4 as written should be patentable over the reference cited. In addition, because claims 5 and 6 ultimately depend from claim 4, the applicant believes that these claims are allowable as well.

Furthermore, the applicant believes that claim 7 as written is patentable over the reference cited. In particular, claim 7 includes the following step:

evaluating signals of an additional transmitting/receiving antenna that has a narrow beam ~~sharply focused transmitting/receiving antenna~~ for determination of said phase difference of said reception echo of both coherent receiving channels;

In particular, the prior art does not disclose this step, wherein this step includes focusing this beam on elevation to

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DATE: August 28, 2002

NO. OF PAGES INCLUDING COVER PAGE: ~~18~~ 16

TO: Examiner S. BUCZINSKI

FIRM/DEPT: U.S. PTO - Group 3662

FAX NO. 1-703-872-9326

FROM: Robert W. Griffith

RE: U.S. Patent Application Serial No. 09/889,759
Our ref: WOLFRAMM ET AL-1

If you do not receive all of the pages, please call the above phone number as soon as possible.

Message:

Enclosed please find an Amendment in Response to the First Office Action dated May 28, 2002.

Please confirm receipt at your earliest convenience.

Sincerely,

COLLARD & ROE, P.C.

Robert W. Griffith

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	ARIBERT WOLFRAMM ET AL.-1	EXAMINER:	S. BUCZINSKI
SERIAL NO.:	09/889,759	GROUP:	3662
FILED:	JULY 20, 2001	CONFIRMATION NO.	1045
FOR:	METHOD FOR INTERFEROMETRIC RADAR MEASUREMENT		

AMENDMENT IN RESPONSE TO THE FIRST OFFICE ACTION

ATTN.: BOX NON-FEE AMENDMENT
Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the Examiner's First Office Action dated May 28, 2002, with the period for response being three months or until August 28, 2002, please amend the above-referenced application as follows:

IN THE DRAWINGS:

FIG. 2 has been amended. A marked-up copy and a substitute copy of FIG. 2 are enclosed (Attachment A).

IN THE SPECIFICATION:

A marked up copy of those paragraphs changed in the specification is enclosed (Attachment B). Please amend the specification as follows:

On page 1, before paragraph 2, beginning on line 8 (in the preliminary amendment) insert:

--BACKGROUND--

SUBSTITUTE - the following paragraphs for paragraph 1 on page 4, beginning on line 1:

--SUMMARY

The problem is solved with an arrangement for interferometric radar measurement having a transmitter and two assigned coherent receiving antennas with receiving channels. The transmitter and receiving antennas are arranged on the turnstile of the ROSAR system of a helicopter radar. An additional transmitting/receiving antenna is provided for that is sharply focuses in the elevation direction. The transmitter and receiving antennas are arranged at the end of the turnstile. The receiving antennas are arranged at the end of the turnstile.

The arrangement includes a process whereby two coherent receiving antennas with receiving channels are assigned to a transmitter, and the path length difference of the two distances can be calculated to measured receiving point P from the wave length of the transmitted radar signal and of the measured phase difference of the reception echo of both coherent receiving channels. A helicopter operating according to the ROSAR principle is used for the interferometric radar measurement, whereby two

coherent receiving antennas are assigned to a transmitter of the ROSAR system arranged on a rotating turnstile on the radar. Additionally, receiving signals of a sharply focused transmitting/receiving antenna can be evaluated for determination of the phase difference.

The sight angle is used for calculating the coordinates of the respective receiving point for representing the image points on the integrated graphic display screen in the ROSAR system. The antennas and the center of the image on the graphic display screen are in a fixed relationship to each other.--

On page 4, before paragraph 2, beginning on line 7, insert:

--BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and features of the present invention will become apparent from the following detailed description considered in connection with the accompanying drawings which disclose at least one embodiment of the present invention. It should be understood, however, that the drawings are designed for the purpose of illustration only and not as a definition of the limits of the invention.

In the drawings, wherein similar reference characters denote similar elements throughout the several views:--

On page 4, before paragraph 5, beginning on line 14, insert:

--DETAILED DESCRIPTION--

On page 7, paragraph 6, beginning on line 11:

The altitude h is actually not required in connection with the INROSAR system for representing the image points on the graphics display screen DS, but only the sight angle θ is used for calculating the coordinates of an impact point P on the integrated graphics display screen in the ROSAR system. Furthermore, whether the angle of inclination of the antenna is known or not is unimportant as well because the representation on the display screen is only a relative representation of the image points with respect to the vertical line in relation to the base line B of the two antennas A1 and A2. The representation of the image is in fact dependent upon the position of the helicopter, for example due to the pitching; however, the antennas of the INROSAR-system and the center of the image are always in a fixed relation to each other. The altitude h and the angle of inclination α of the antennas are only required if a topographical chart with an absolute altitude H of the area over which the aircraft is passing is to be generated with the help of said INROSAR-system. The formulas specified above are useful also for a consideration of errors, as will be explained in the following.

IN THE CLAIMS:

Please cancel claims 1-3 without prejudice and add claims 4-9 as follows:

--4. An arrangement for interferometric radar measurement comprising:

a transmitter disposed on a turnstile of a ROSAR system of a helicopter radar;

at least two assigned coherent receiving antennas having receiving channels disposed on a turnstile of a ROSAR system of a helicopter radar; and

an additional transmitting/receiving antenna sharply focused in the elevation direction.

5. The arrangement for interferometric radar measurement according to claim 4, wherein said transmitter and said at least two assigned coherent receiving antennas are arranged at an end of said turnstile.

6. The arrangement for interferometric radar measurement according to claim 4, wherein said receiving antennas are

positioned vertically over each other in a normal position of a helicopter.

7. A process for interferometric radar measurement comprising the steps of:

assigning two coherent receiving antennas having receiving channels to a transmitter;

calculating a path length difference of two distances to a measured receiving point from the wave length of a transmitted radar signal and of a measured phase difference of a reception echo of both coherent receiving channels;

assigning said two coherent receiving antennas to a transmitter of a ROSAR system;

arranging said two coherent receiving antennas and said transmitter on a rotating turnstile of a radar; and

evaluating signals of a sharply focused transmitting/receiving antenna for determination of a phase difference;

wherein a helicopter operating according to the ROSAR principle is used for the interferometric radar measurement.

8. The method according to claim 7, further comprising a step of calculating coordinates of a respective receiving point using a sight angle for representing image points on an integrated graphic display screen in the ROSAR system.

9. The method according to claim 9, wherein said antenna and a center of an image on said graphic display screen are in a fixed relationship.--

REMARKS

Reconsideration of this patent application is respectfully requested in view of the foregoing amendments and the following remarks.

The Examiner has provisionally rejected claims 1-3 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of U.S. Patent Application Ser. No. 09/889,758. The present application is patentably distinct from the '758 application because the present application is configured for use on the end of a turnstile of helicopter. The '758 application is created for use on a tower and claims a rotating arm.

The Examiner has objected to the drawings. FIG. 2 has been amended to clearly label the display screen. Further, image points on a graphics display screen are commonly known to those in the field, and the applicant believes that they have been adequately shown in the drawing. Additionally, the image points on a graphics display screen are included in a dependent method claim and are not an element of the apparatus being claimed.

The Examiner has rejected the specification and claims 1-3 under 35 U.S.C. 112, first paragraph. Claims 1-3 have been cancelled without prejudice and claims 4-9 have been added. Claims 4-9 and the amended specification clearly set forth the invention. The image points of the graphics display screen are described on pages 7 and 8 beginning on paragraph 3 of page 7. Further, the image points on a graphic display screen are commonly known to those in the field, and the applicant believes that they have been adequately described in the specification.

The Examiner has rejected claims 1-3 under 35 U.S.C. 112, second paragraph, as being indefinite. Claims 1-3 have been cancelled without prejudice and claims 4-9 have been added and do not contain improper or ambiguous antecedents.

The Examiner has rejected claims 1-3 under 35 U.S.C. 103(a) as being unpatentable over *Brown, Boles*, or *Madsen et al*, any one in view of *Kreitmair-Steck et al*. Claims 1-3 have been canceled and claims 4-9 have been added.

None of the references mentioned by the Examiner describe an interfermoteric radar measurement in conjunction with the ROSAR principle. The ROSAR principle and interferometric radar measurement are described separately in the state of the art, but the combination of those principles as disclosed by the present invention provides an important advantage over the state of the art. For an exact three-dimensional radar measurement, movement of the platform which carries the radar measurement equipment is no longer necessary. This movement of the whole platform is replaced by a movement of the revolving rotary cross of the ROSAR equipment. As a consequence, exact three-dimensional radar measurements are even possible when the carrying platform, for example a helicopter, is not moving, which means that the helicopter does not necessarily need to fly to perform exact three-dimensional radar measurements.

In addition, it has been clarified in the proposed claims, that in order to avoid phase ambiguity a transmitting/receiving antenna is proposed that is sharply focused in elevation. These technical features are not disclosed by a single reference or a combination of references mentioned by the examiner. As a

consequence, the applicant considers the proposed claims to be patentable over the state of the art.

Claims 1-3 have been canceled without prejudice. Claims 4-9 have been added. No new matter has been added. Accordingly, the Applicant submits that the claims as presented are patentable over the references cited, taken either singly or in combination.

Early allowance of the amended claims is respectfully requested.

Respectfully submitted,

ARIBERT WOLFRAMM ET AL. -1 (PCT)

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ACC:RWG
Enclosures: Attachments A and B

I hereby certify that this correspondence is being faxed to the U.S. Patent Office, Attention: Examiner: S Buczinski, Group 3662 at (703) 872-9326 on August 28, 2002.

Vita Bencivenni

R:\Robert\Wolframm\Wolframm-1 Amend.wpd

Attachment A

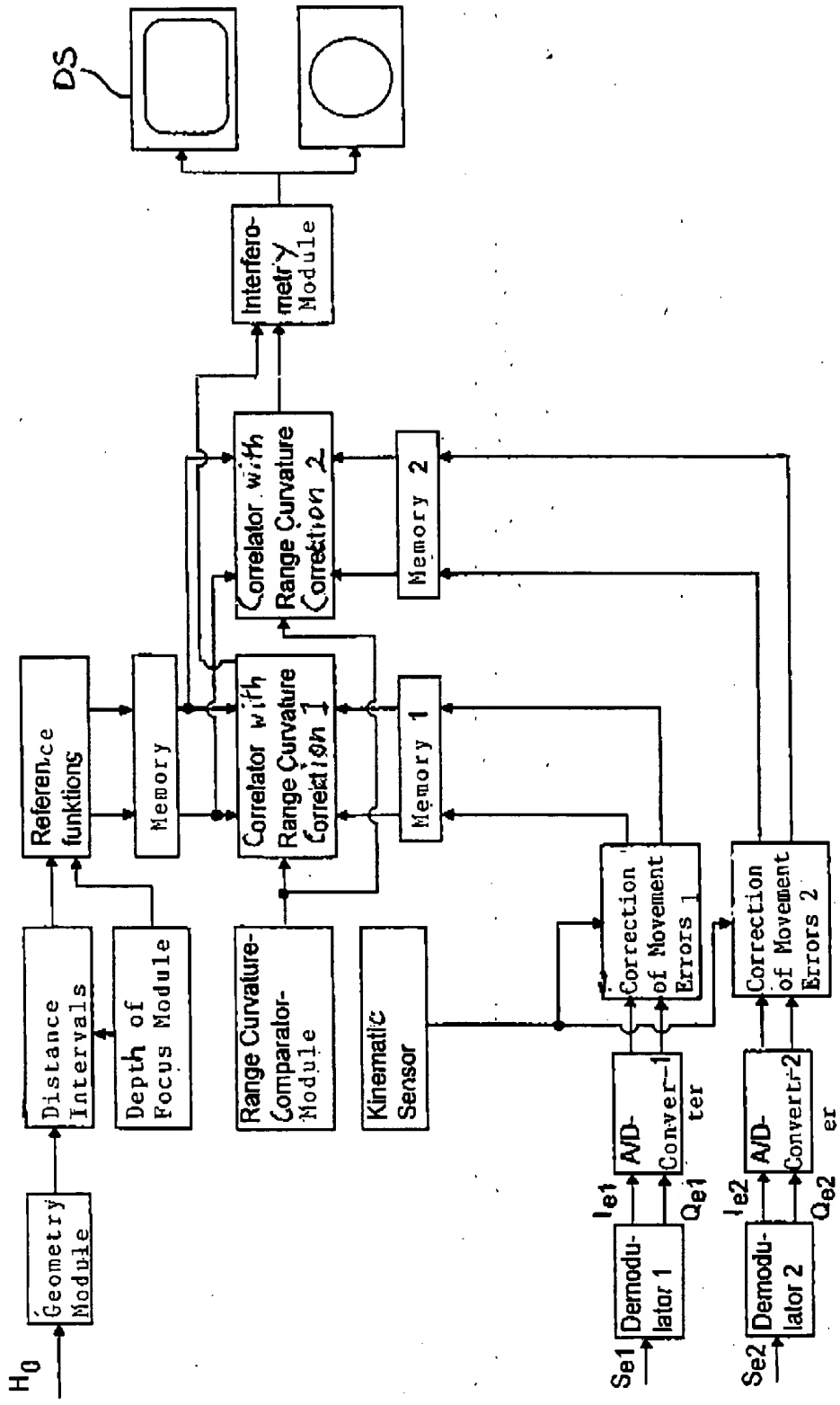

Fig. 2

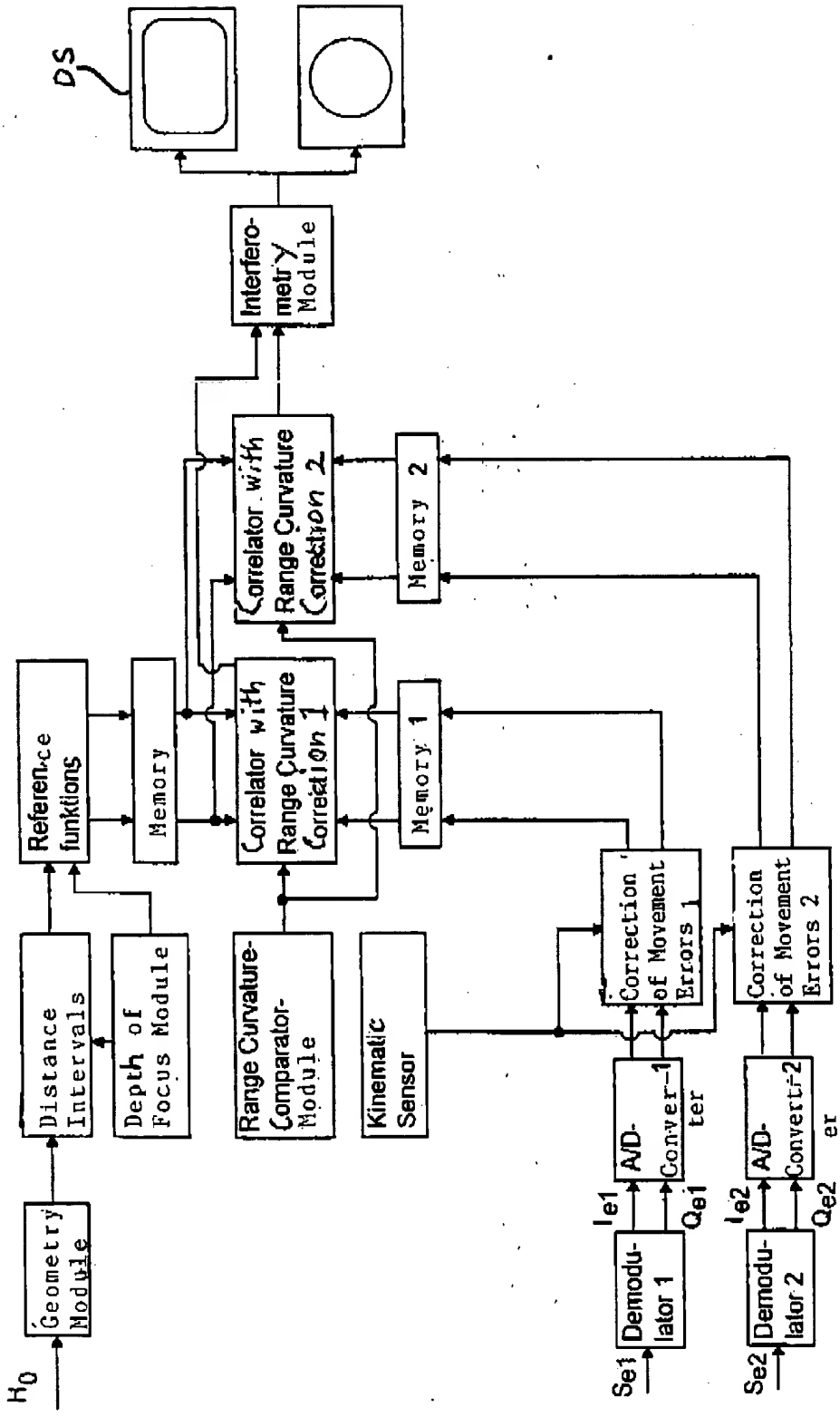

Fig. 2

Attachment B

MARKED-UP SPECIFICATION
APPLICATION NO. 09/889,759
APPLICANT: ARIBERT WOLFRAMM ET AL. -1

EXAMINER: S. BUCZINSKI
GROUP: 3662

On page 7, paragraph 6, beginning on line 11:

The altitude h is actually not required in connection with the INROSAR system for representing the image ~~dots~~ **points** on the graphics display screen **DS**, but only the sight angle θ is used for calculating the coordinates of an impact point P on the **integrated** graphics display screen **in the ROSAR system**. Furthermore, whether the angle of inclination of the antenna is known or not is unimportant as well because the representation on the display screen is only a relative representation of the image ~~dots~~ **points** with respect to the vertical line in relation to the base line B of the two antennas A1 and A2. The representation of the image is in fact dependent upon the position of the helicopter, for example due to the pitching; however, the antennas of the INROSAR-system and the center of the image are always in a fixed relation to each other. The altitude h and the angle of inclination α of the antennas are only required if a topographical chart with an absolute altitude H of the area over which the aircraft is passing is to be generated with the help of said INROSAR-system. The formulas specified above are useful also for a consideration of errors, as will be explained in the following.

determine the absolute azimuth and elevation information. Therefore, the applicant believes that claim 7 and dependent claims 8 and 9 which depend from claim 7 are patentable over the reference cited.

Respectfully submitted,

ARIBERT WOLFRAMM ET AL. -1 (PCT)

William C. Collard

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ACC: WCC

I hereby certify that this correspondence is being faxed to the U.S. Patent Office, Attention: Examiner: S Buczinski, Group 3662 at (703) 872-9326 on August 11, 2003.

William Collard